Breaking Bridges Worksheet

**PREDICT**

Record here your predictions for the mathematical relationships between the number of pennies a paper bridge can hold when you (A) vary its thickness and (B) vary its length.

**EXPERIMENT**

Part (A) Thickness

Record your data in the table below and then graph the data and develop a mathematical rule for the data that describes the relationship between bridge thickness and the number of pennies it can hold. Then use the model to predict how many pennies the bridges of thickness 6, 7, and 8 can hold. Then test out your predictions.

Table of Data Graph

|  |  |
| --- | --- |
| Thickness | # of pennies |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |

Rule for the relationship: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Predict the number of pennies the bridges of thickness 6, 7, and 8 can hold using your table, the graph and the rule. What are your predictions and how close did you come to the actual measurement?

Part (B) Length

Record your data in the table below and then graph the data and develop a mathematical rule for the data that describes the relationship between bridge length and the number of pennies it can hold. Then use the model to predict how many pennies the bridges of length 2, 3, and 4 inches can hold. Then test out your predictions.

Table of Data Graph

|  |  |
| --- | --- |
| Length (in) | # of pennies |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |
| 8 |  |

Rule for the relationship: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Predict the number of pennies the bridges of length 2 and 4 inches can hold using your table, the graph and the rule. What are your predictions and how close did you come to the actual measurement?

**DISCUSS**

Decide together what you have discovered in the two experiments. How are the results similar and how are they different? What elements of a mathematical model have you used here? How are they related to each other? With which representation are you more comfortable? Why? What is the advantage of formulating a rule?

Explain why your predictions based on the model you created may not necessarily be exactly what you measure in the experiment.